2014 Insect Report

Utah Department of Agriculture and Food

PLANT INDUSTRY & CONSERVATION

2014 UDAF Insect Report

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USDA Forest Service Forest Health Protection

National Plant Board

USU Plant Pest Diagnostic Lab

Utah Nursery and Landscape Association

DHS United States Citizenship and Immigration Services

UTAH FRUIT GROWERS

UTAH WEED SUPERVISORS ASSOCIATION

UDAF Plant Industry thanks all of our partners as well as the following entomologists:

Steve Munson	James Pitts	Jim LaBonte
Cory Stanley-Stahr	Ryan Davis	Lori Spears
Ted Evans	Rick Westcott	Seasonal staff

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Protecting Utah Agriculture

Utah agricultural industries are valued at over a billion dollars annually, which constitutes about 22% of the state's land in agricultural production. The mission of the Utah Department of Agriculture and Food (UDAF) is to "Promote the healthy growth of Utah agriculture, conserve our natural resources and protect our food supply." Managing insects is essential to this mission. Although most insects are beneficial, pest infestations can be devastating. Hence UDAF Plant Industry has been addressing insect issues since pioneer agriculture began here 160 years ago. Some economic estimates of losses to U.S. food crops due to pests approach 40%. Both newly introduced insects and outbreaks of endemic species can cause sudden losses much like a natural disaster. Trends that contribute to these losses include erratic weather patterns and climate change, intensive monoculture farming methods and global commerce, which commonly transports materials of risk great distances. The UDAF Plant Industry Insect Program aims to protect Utah agriculture, food,and quality of life from losses due to insects.

Goals and Strategies of the Insect Program

Prevention and Protection

Insects are transported in various ways, often unintentionally. Using quarantines and inspections can prevent the establishment of new pests. Surveillance of insects with outbreak potential allows protection of resources at risk.

Early Detection

Using strategic detection, diagnostic networks, and trap and survey technology to detect pests as early as possible minimizes insect damage and the cost of eradication or control. UDAF Plant Industry annually surveys and traps over 8,000 locations statewide and works with partners nationwide to share information and employ the latest detection methodology.

Insect Control

There are many effective tools for insect control and more are being developed. UDAF Plant Industry uses survey methods, predictive models and economic thresholds to determine the best course of action using a variety of tools to suppress pest populations such as: chemical pesticides, biological controls or cultural methods.

Public Education

Raising awareness of how insect pests are introduced and the consequences of outbreaks can facilitate early detection efforts and protect resources. Teaching Integrated Pest Management principles can also help protect beneficial insects and increase environmental stewardship.

Public Education & Detection

Africanized Honey Bee

UDAF Plant Industry

Africanized honey bees (AHB) are slightly smaller in size, will live in smaller cavities and will swarm more times per year than European honey bees. They will aggressively defend their hives but may attack unprovoked. These bees will follow people or animals a much further distance from the hive and may sting thousands of times per attack. Though these bees are dangerous, they have been unfairly sensationalized in the media; education efforts have decreased panic and stinging incidents nationwide. These bees are typically found next to water sources such as rivers, streams, lakes, canals, and man-made sources. It is thought that these water sources are the highways in which the bees migrate.

JEFFREY W LOTZ, FLORIDA DEPARTMENT OF AGRICULTURE

Fig. 1 It is difficult to distinguish Africanized (pictured) and European honey bees visually.

In 2008, AHB was detected in Utah, in the St. George area. Shortly after, they were found in Kane and Iron counties as far north as Parowan. In 2010, AHB was found in San Juan County in the small town of Bluff. UDAF Plant Industry has been working with beekeepers, setting traps and monitoring feral colonies for AHB since the 2008 detection. In 2014 no swarms were caught in UDAF traps but several aggressive colonies were tested from areas of concern. None of the colonies tested positive for exotic genetics and therefore were likely aggressive for other reasons such as cultural or environmental factors. Currently there are 48 AHB traps in 8 southern Utah counties to monitor the movement of AHB northward. UDAF will continue to monitor and trap for AHB in the future in an effort to inform the public of the presence of AHB in their communities. The program strives to educate the public and commercial beekeepers about AHB, and to address their concerns.

Pollinator Protection

Apiary Program

UDAF Plant Industry

KRIS WATSON, UDAF

Fig. 2 A state apiary specialist examines a bee colony for diseases.

Utah, the "Beehive State", produces well over a million pounds of honey each year. Honey bees are key pollinators of many crops grown throughout the state—from large-scale orchards and farms to backyard fruit trees and gardens. Utah's bees are also important to agriculture nationwide, as many of the state's commercial beekeepers move their hives to other states for pollination services.

In recent years the number of new beekeepers has rapidly increased; there are currently over 2,000 registered beekeepers in the state (a more than five fold increase over 10 years). This surge in new beekeepers has been due to the rise in popularity of hobbyist beekeeping and UDAF Plant Industry's efforts in encouraging municipalities to allow urban beekeeping.

The numerous diseases, parasites, and other maladies that affect these colonies are important concerns for UDAF Plant Industry. The Apiary Program has been active in protecting these managed colonies by providing health inspections, disease testing, education regarding pest and disease management, and coordinating two statewide surveys of honey bee health. The combined efforts of state apiary specialists and county bee inspectors resulted in thousands of hives surveyed. These inspections revealed eight outbreaks of the most devastating honey bee disease, American foulbrood (AFB). The infections were found in Iron, Salt Lake, Utah, and Davis counties. All registered beekeepers within a four miles radius of the outbreaks were contacted via phone and email to warn of the contagion's presence in their area. UDAF Plant Industry contained these cases by working with beekeepers to treat or destroy infected colonies.

Fruit Industry

Apple Maggot & Cherry Fruit Fly

Utah Fruit Growers
UDAF Plant Industry

USU EXTENSION IPM PROGRAM

Fig. 3 An immature apple maggot.

USU EXTENSTION IPM PROGRAM

Fig. 4 A cherry fruit fly in the larval stage.

The apple maggot (*Rhagoletis pomonella*), also known as the "railroad-worm," and the cherry fruit fly (*R. indifferens),* are both picture-wing flies native to North America. Both insects have become major pests of fruit trees in the U.S. and Canada. The UDAF Plant Industry program began in 1985 with the discovery of apple maggot in abandoned and non-commercial cherry orchards in Utah County. In 2014, 16 sites were monitored during the growing season and cherry fruit flies were found in Box Elder, Davis, Salt Lake, and Utah counties.

There are approximately 615 commercial fruit growers in Utah, with a commercial value of an estimated $17 million annually. All fruit marketed for export must be free from any apple maggot and cherry fruit fly injury, so thorough and effective control measures are necessary. This program allows Utah fruit growers to export fruit outside of Utah.

In addition to trapping, this program provides commercial growers with information to improve insecticide spray timing. Accurately timed sprays result in the following: better control, smaller amounts of pesticides being used, less environmental impact, and lower production costs. Without proper control, these insects could cause serious damage to all tree fruit grown in the state.

Natural Resource Protection

Asian Defoliators

UDAF Plant Industry
USDA APHIS—PPQ
DHS USCIS

DAFF ARCHIVE, BUGWOOD.ORG

Fig. 6 The nun moth (Lymantria monacha) is a serious forest pest. Pictured is an adult female.

STANISLAW KINELSKI, UGA

Fig. 5 A nun moth pupae in Poland.

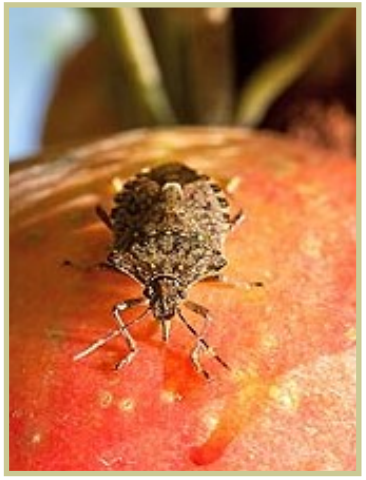
Asian defoliators (e.g., *Dendrolimus pini, D. sibiricus, Lymantria monacha, L. dispar asiatica*) pose a significant potential threat to Utah's forests and related industry. Due to an increase of shipments of containerized cargo and the movement of plant material into Utah, monitoring for the presence of Asian defoliators and other exotic forest pests is crucial to protect our natural resources. Exotic defoliators have a large host range that includes all species of conifer and hardwood trees found throughout the state. If introduced, the forests and climate of Utah provide ideal settings for these species to become established. Asian defoliators can be introduced through commerce because females can deposit eggs in crevices on containers, pallets, and ships. Adult moths have been observed in many Asian and Russian Far East ports. Using pheromones specific to these pests, UDAF Plant Industry places traps in high-risk areas of the state. Trapping areas include shipping corridors along railroads and highways, landing points including airports and military bases, areas where large quantities of plant debris are collected, and any high risk areas recommended by U.S. Customs and Immigration Service and USDA APHIS-PPQ. In 2014, 600 traps were deployed to detect adults of these species with negative results for all species.

Fruit Industry

Brown Marmorated Stink Bug

USU Department of Biology,
Lori Spears
UDAF Plant Industry

The first U.S. detection of the brown marmorated stink bug (BMSB), *Halyomorpha halys*, which is native to Asia, occurred in the 1990's in Allentown, PA. Since its introduction the pest has spread quickly, having been reported in 42 states thus far. In some of the infested states, damage has been devastating. Unlike many agricultural pests, BMSB is a year-round problem. It can cause severe damage as it feeds on fruits and leaves, resulting in necrotic tissue and cat-facing injury. In the fall, BMSB migrates indoors where it aggregates, becoming a nuisance pest and emitting a foul odor when disturbed or destroyed.



STEPHEN AUSMUS, USDA ARS

Fig. 7 BMSB is both an agricultural and nuisance pest.

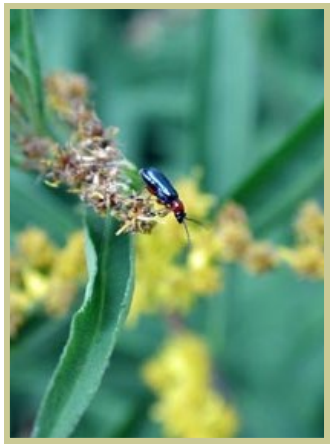
Continued survey for the BMSB was conducted in Utah in 2014. A total of 66 brown marmorated stink bug traps were placed at 66 different locations in nine counties. Traps were in place from June to November, 2014. Sites included community gardens (multiple vegetable crops) and farms growing caneberries, sweet cherries, tart cherries, apples, peaches, and other fruits. Traps were checked for BMSB presence every two weeks. Lures were replaced every four weeks. Through cooperative efforts a total of five BMSB's were found in Salt Lake County.

In 2015, state agricultural officials plan on continuing to survey for this pest throughout Northern Utah.

Crop Protection Export Program

Cereal Leaf Beetle

UDAF Plant Industry
USU Department of Biology,
Ted Evans Lab



HANIA BERDYS, BUGWOOD.ORG

Fig. 8 California has ended its quarantine of cereal leaf beetle.

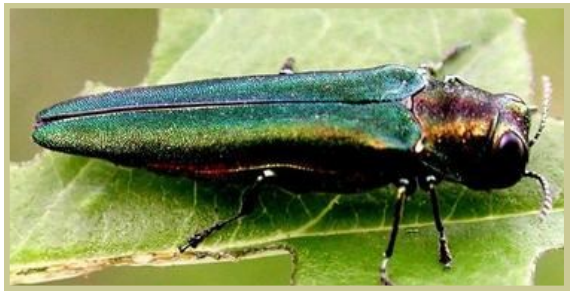
The cereal leaf beetle (CLB; *Oulema melanopus*), has been spreading across the U.S. for about 50 years. In Utah, it was first recognized in Morgan County in 1984, where it was causing economic damage on barley, oats, and wheat. Since then it has been detected in 16 counties, however it is only considered to be established in three counties (Box Elder, Cache and Weber). The CLB prefers irrigated fields of oats, wheat, and barley. Initially UDAF Plant Industry began annual statewide surveys for this pest, in part to satisfy the requirements of the California CLB Quarantine, so that Utah growers could export to California. However during the spring of 2014, the California CLB State Exterior Quarantine was discontinued and no longer enforced by California administration.

Utah State University Department of Biology continues to release the wasp *Tetrastichus julis*, which parasitizes and kills the CLB larvae. Past CLB surveys have determined that all counties positive for CLB also have substantial levels of these parasitoids. In general, infestation levels of CLB were highly variable among fields in 2014, this was observed though sampling that was conducted in conjunction with ongoing biological control research and development. The parasitoid population stays highest when growers tolerate sub-economic injury levels of CLB. In contrast, the parasite population is set back substantially with each chemical application to control CLB.

Urban Habitat Protection

Emerald Ash Borer

USDA APHIS PPQ
UDAF Plant Industry



LEAH BAUER, UGA, BUGWOOD.ORG

Fig. 9 The emerald ash borer is responsible for the destruction of millions of ash trees in the U.S.

Emerald ash borer (EAB; *Agrilus planipennis*) is native to Asia, and was introduced through wood packing material used to ship cargo from Asia to Michigan in 2002. EAB continues to spread rapidly to states and provinces in and around the Great Lakes region in Canada and the USA. EAB quickly killed many millions of ash trees (*Fraxinus* sp.) in these areas, and can now be easily spread from infested areas by transporting infested trees and logs (especially firewood). In its native ecosystem, this insect exists in balance with competitors, natural predators, and pathogens. It does not cause economic damage in this setting. However, in North America, without these balancing factors, EAB has caused rapid tree mortality affecting all ash species it attacks. Symptoms of infestation begin with crown dieback, which is followed by epicormic shoots, splitting bark, increased woodpecker damage, serpentine galleries, and D-shaped exit holes. These symptoms progress until the tree is dead.

In addition to Utah's many ornamental ash trees in urban landscapes, there are two native ash species that are part of the forest ecosystem. All of these species would be vulnerable to EAB attack, causing economic and aesthetic losses in urban areas and ecological impacts in natural settings. In 2014, APHIS PPQ placed 32 baited traps throughout 11 counties, targeting high-risk ash trees that exhibited symptoms associated with unhealthy or declining trees. No EAB were detected from these efforts.

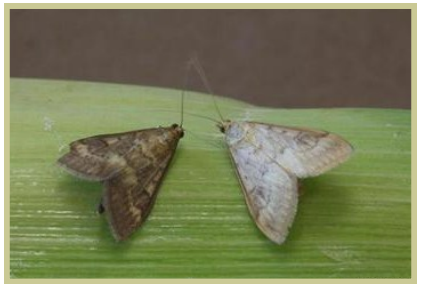
Crop Protection Export Program

European Corn Borer

UDAF Plant Industry

ADAM SISSON, IOWA STATE UNIVERSITY, BUGWOOD.ORG

Fig. 10 The larval form of the European corn borer has a pinkish tan body.



ADAM SISSON, IOWA STATE UNIVERSITY, BUGWOOD.ORG

Fig. 11 Adults exhibit dark zigzag marks across the wings.

This highly adaptable pest attacks over 200 plant species. During its early history in the United States, the European corn borer (*Ostrinia nubilalis*) spawned one generation yearly. By the late 1930s, a two-generation per annum European corn borer mushroomed swiftly and became a dominant pest in the central Corn Belt. It continued spreading in all directions, with the southernmost populations spawning three and four generations per year.

UDAF Plant Industry administers a quarantine for small grains and other agricultural crops that may contain the European corn borer to prevent this destructive insect from entering Utah. When shell corn is brought into the state from the Midwest every year, the shipments are certified that they meet Utah's European Corn Borer Quarantine.

UDAF Plant Industry also coordinates a European corn borer trapping program. This program consists of 101 traps placed in chief corn producing areas including 20 counties. No new records of the European corn borer were found in Utah in 2014.

Invasive Species Early Detection

Gypsy Moth

UDAF Plant Industry
USDA APHIS—PPQ
USDA Forest Service—FHP

JOHN H GHENT, USDA FOREST SERVICE; BUGWOOD.ORG

Fig. 12 UDAF has successfully eradicated gypsy moth populations introduced to Utah.

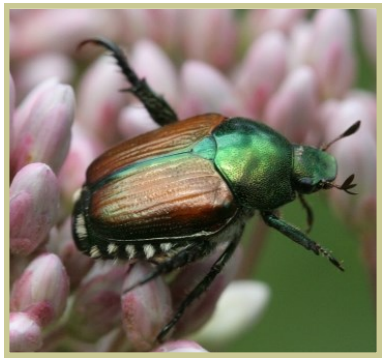
Gypsy moth (GM; *Lymantria dispar*) is established in the eastern U.S. Because their egg masses are laid on virtually any substrate, they are often moved long distances to new territory. Utah's arid climate and mountainous terrain have a high potential for GM introduction and establishment; this is capable of causing widespread negative impacts on Utah's landscapes. Utah is not part of the contiguous range of GM populations in the Eastern U.S. Therefore GM early detection and, if necessary, eradication are cost effective strategies to prevent establishment of this forest and urban pest in Utah. GM was first found in Utah in 1988. Since then, UDAF Plant Industry has been the lead agency in the administration of a major survey and control program. When populations are found, they can be treated and effectively eradicated before damage occurs. UDAF Plant Industry has successfully eradicated introduced GM populations twice using the bacterium *Bacillus thuringiensis* var. *kurstaki (Btk)* and annually monitors for new introductions. The 2014, Utah Gypsy Moth Program placed 1,856 detection traps using the GMWest model BioSIM to determine areas of highest risk of introduction and establishment. This model integrates climate and elevation data to predict the probability of GM establishment. From 2000 the GM detection program has trapped 15 single males in individual pheromone traps. In every case, further delimitation surveys have produced negative results. No GM has been detected in Utah since 2008.

Early Detection & Eradication

Japanese Beetle

UDAF Plant Industry
USDA APHIS—PPQ

The Japanese beetle (JB; *Popillia japonica*) is a highly ruinous pest which causes plant damage and increases control costs. It has swept through most of the eastern United States. Adults attack more than 300 species of plants, including numerous trees, ornamental shrubs, vines, fruits, flowers, vegetables, garden crops, weeds, and field crops. Larvae are serious pests of lawns, other grasses, and nursery stock. Because the larvae are easily shipped with nursery stock and soil, JB is a serious threat to Utah's $128 million nursery and floriculture economy and has been part of UDAF Plant Industry's detection trapping program since 1993. When a JB infestation was discovered in Orem, Utah in 2006, the infestation was delimited using pheromone baited traps, and an eradication plan was devised.



DAVID CAPPAERT, MICHIGAN STATE UNIVERSITY

Fig. 13 Japanese beetles cause severe damage to many ornamental plants.

Treatment began in 2007 with turf and foliar applications. Delimiting data has allowed the treatment areas to shrink over consecutive years and no treatments were conducted in the past two years. With two years of negative catches in the Orem area, UDAF has declared eradication of the Utah County JB population. However the ongoing threat of JB continues. In 2013 a single male JB was found in Salt Lake County and in 2014 two solitary male beetles were found in Salt Lake County. After implementing high density grids no additional beetles were found. Continued high density delimiting grids will be conducted in the area during 2015.

In 2015 attention will focus on the nursery plant trade and continued state wide monitoring will occur to ensure this pest does not establish in Utah.

Cropland & Rangeland Habitat Protection

Mormon Cricket & Grasshopper

UDAF Plant Industry
USDA APHIS—PPQ

STEVE DEWEY, USU BUGWOOD.ORG

Fig. 14 Insecticide applications are more effective in earlier stages of the Mormon Cricket's life cycle.

For the past decade, disaster declarations by the governor have focused resources (administered through UDAF Plant Industry) to provide relief from major infestations of Mormon crickets (*Anbrus simplex*) and grasshoppers (various genera). Mormon cricket and grasshopper infestations are historically significant because they are difficult to predict and cause widespread damage to crop and rangeland habitats. The overall goal of the UDAF Plant Industry grasshopper and Mormon cricket program is to facilitate biologically sensitive and effective suppression programs before widespread damage occurs. In 2014 a total of 224,434 acres were infested; cost share programs were approved in 12 counties for 59 participants. Elements that have contributed to successful control of rangeland pest are: Available funding, collaboration with all affected stakeholders, and accurate survey data.

In 2014, no treatment programs were conducted on behalf of UDAF. However UDAF Plant Industry did share the cost of treatments with farmers and ranchers for infestations of grasshoppers on private land. The cost share program is an ongoing effort to support farmers and ranchers ability to suppress rangeland pests from damaging crops.

Fruit Industry Export Program

Plum Curculio

Utah State University
Utah Fruit Growers
UDAF Plant Industry

CLEMSON UNIVERSITY EXTENSION; BUGWOOD.ORG

Fig. 15 Larvae burrow into fruit and feed on the pits if unhardened.

CLEMSON UNIVERSITY EXTENSION; BUGWOOD.ORG

Fig. 16 The adult also causes damage by feeding on the fruit surface.

Utah's fruit industry is valued at approximately $17 million annually, with over 615 operations growing at least 6,700 acres of cherries, peaches, and apples. Plum curculio (*Conotrachelus nenuphar*) is a pest of stone and pome fruits and is native to eastern North America. In 1999, it was detected in backyard fruit trees in Brigham City.

The presence of plum curculio in Brigham City is sustained by unmanaged fruit trees located in residential areas. Unmanaged fruit trees serve as a reservoir for populations of this insect. Each year Utah State University and UDAF Plant Industry, in conjunction with Brigham City, send out an informational pamphlet to educate home owners about this insect and how to manage or remove the fruit trees.

Utah's fruit orchard survey consists of 16 sentinel sites in Box Elder, Utah and Davis counties. Traps designed to collect plum curculio with a specific lure were placed at each site. Traps were serviced every two to four weeks from late May to early November in 2014. Eight plum curculios were detected in three different locations in Box Elder County. No plum curculios were detected in Davis and Utah counties.

Public Health & Nuisance

Red Imported Fire Ant

USDA APHIS—PPQ
USU Department of Biology,
Lori Spears

USDA APHIS PPQ ; BUGWOOD.ORG

Fig. 17 RIFA mounds are dome-shaped and up to 1 ft high; they are sometimes mistaken for gopher mounds.

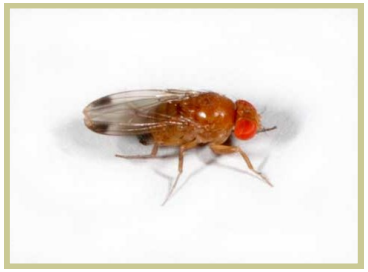
Imported fire ants are both a public health risk and an economic threat. They are federally quarantined pests not known to occur in Utah. However, these pests could easily be introduced if infested soil were brought into the state. They were first introduced to the southern U.S. in the 1930s from South America. Imported Fire ants can feed on many agricultural crops, including corn, soybean, and fruit trees. The aboveground mounds make cultivation, irrigation, and harvesting almost impossible. Imported fire ants can infest urban areas and become a nuisance that deters outside activity. Not only are imported fire ant mounds unattractive, the ants are aggressive and sting humans and other animals. UDAF Plant Industry uses quarantine enforcements, port of entry inspections, and public education to keep Utah free of imported fire ants. Annual surveys to detect introductions of red imported fire ant (RIFA; *Solenopsis invicta)* and the black imported fire ant (BIFA; *S. richteri*) have focused on Washington County, which is the most suitable climate and habitat for this pest in Utah.

Utah State University sampled 20 sites in 2014. During this survey, RIFA or BIFA was not detected at any of the sites. However the native *Solenopsis* species, *S. xyloni*, has been detected at several sites; its presence indicates RIFA/BIFA have not yet established in Washington County, Utah.

Fruit Industry

Spotted Wing Drosophila

USU Biology Department,
Lori Spears



MARTIN HAUSER, UC DAVIS IPM

Fig. 18 The adults measure between 1/16 and 1/8 inch long

HANNAH BURRACK, NORTH CAROLINA UNIVERSITY

Fig. 19 SWD prefer softer-fleshed fruits, such as raspberry

Utah's fruit industry occurs on approximately 7,000 acres and is valued at $17 million. In 2014, Utah State University surveyed for spotted wing drosophila (SWD; *Drosophila suzukii*) which could devastate the eight different tree fruits and six different berries grown by at least 370 operations in Utah.

Outreach workshops were conducted in high risk areas educating growers and homeowners about SWD biology and management, with the main focus on monitoring (trapping) procedures. Workshops demonstrated how traps are made, and participants were given a trap and other useful monitoring tools to take home. Additionally, participants were given pocket sized SWD identification cards and handouts providing further information. 90% of participant submitting evaluations indicated that they were "very likely" to begin their own SWD monitoring programs.

In addition to the 2014 outreach, a survey for SWD focused on 152 sites in Box Elder, Cache, Davis, Rich, Salt Lake, Utah and Weber Counties. Each trap used yeast/sugar bait. A total of 3,582 SWD were found and five new county records were detected (Box Elder, Cache, Rich, Utah and Weber counties). All *D. suzukii* samples were screened by Lori Spears and her lab technicians at Utah State University. In 2015, state agricultural officials are planning to continue surveys for this pest in high fruit production and commercial orchards areas.

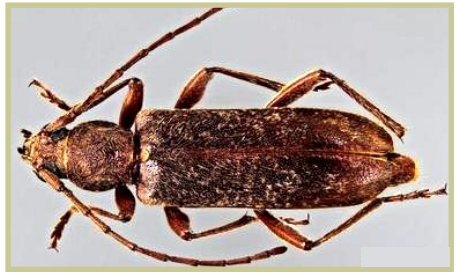
Early Detection & Rapid Response

Velvet Longhorn Beetle

UDAF Plant Industry
USDA APHIS—PPQ
DHS USCIS

The velvet longhorn beetle (VLHB; *Trichoferus campestris*) was first discovered in North America in the province of Quebec, Canada in 2002. It was first detected in Utah at a trapping site in South Salt Lake City in July 2010.

The VLHB attacks healthy or slightly stressed trees of many important species. It prefers to attack mature trees, which results in tree death or causes significant loss of vigor. This damage results in a devaluation of host trees in urban settings, a loss of wood marketability (because of the boreholes) and/or reduced fruit yields in the case of orchards. Nevertheless, the relative importance of VLHB in damaging forest trees, trees in natural environments, orchard trees, and amenity trees has not been evaluated beyond the observation that the preferred hosts are fruit or amenity trees (*Malus* and *Morus*).



STEVEN VALLEY, OREGON DEPARTMENT OF AGRICULTURE

Fig. 20 This insect can be transported to uninfested areas by moving firewood.

A survey for the VLHB and other exotic wood boring beetles was conducted in Utah in 2014. 80 Lindgren funnel traps were placed at 36 sites in Salt Lake, Box Elder, Utah, Iron and Davis County, which targeted stone and machinery importers, riparian corridors and fruit orchards. The lures used were ethanol, ethanol with alpha-pinene, and Ips trilure. In addition two light traps were used periodically for additional survey. From these traps 153 VLHB specimens were detected at 16 different sites in Salt Lake and Utah Counties. State and federal agricultural officials plan to continue survey in the areas in 2015.

Invasive Species Habitat Restoration

Weed Biological Control

USDA APHIS—PPQ
Utah Weed Supervisor Ass.,
Jerry Caldwell

UGA BUGWOOD.ORG

Fig. 20 Utah has 3 classes of noxious weeds. Black henbane is a "Class A" weed and is of very high priority for control.

MARY ELLEN HARTE BUGWOOD.ORG

Fig. 21 Houndstongue is a

Noxious weeds are spreading at an alarming rate across the western United States, including Utah. Although the exact acreage is unknown, 100% of Utah's counties are severely infested by at least one of the state-designated 27 noxious weeds. The negative impacts of weeds are well known and profound. Noxious weeds can create monocultures that eliminate diverse plant communities. Watersheds dominated by noxious weeds tend to be less efficient in absorbing and storing water resulting in increased soil erosion. Noxious weeds can diminish forage production for all classes of herbivores and reduce habitat for small birds and animals. In addition, many noxious weeds are poisonous or injurious to animals.

The biological control of noxious weeds remains a cost effective and environmentally friendly method of preserving range habitat from invasive species. In 2014 the Utah Weed Supervisor Association conducted outreach education about bio-control agents in conjunction with collecting and distributing biological control agents to help restore critical habitat.

Early Detection & Rapid Response

Wood Borer Survey

USDA FS Forest Health Protection
UDAF Plant Industry

DAVE POWELL, USDA FOREST SERVICE & BUGWOOD.ORG

Fig. 20 Galleries beneath the bark created by the mountain pine beetle (*Dendroctonus ponderosae*).

Bark beetle damage is a conspicuous reality in the forests of the Western United States. Several exotic species of wood borers have been detected throughout North America in the past decade. Some invasive species of wood borers have caused devastating tree mortality and subsequent loss of critical habitat. Exotic wood borers are being transported by the global movement of soft and hardwood packing material. These materials are used by foreign exporters to transport commodities, such as glass, machinery, stone, tile, and plumbing fixtures. International efforts have succeeded in creating policy that requires the treatment of these materials, however, introductions of exotic wood borers continues to occur.

Invasive species survey is a critical component of the early detection and rapid response (EDRR) model used nationally. In 2014, the UDAF Plant Industry received Forest Service, Forest Health Protection funding to place traps that are designed to attract a variety of wood boring beetles. 66 Lindgren funnel traps were placed at 23 different sites along the Wasatch front. The traps were baited with the following combination of lures: Ips complex lure, ethanol and a-pinene lures, and a-pinene lure. Over 11,000 individual specimens were identified to species, with no new exotic species detected.

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Utah Agriculture Web Resources

2014 Plant Industry Insect Report
http://ag.utah.gov/documents/2014InsectReport.pdf

Utah Plant Pest Diagnostics Lab
http://utahpests.usu.edu/uppdl/

Utah Cooperative Agricultural Pest Survey
http://utahpests.usu.edu/caps/

Utah Horticultural Association
http://www.utahhort.org/

Honey Bee Resources
http://bees.usu.edu

Utah Weed Supervisors Association
http://www.utahweed.org/

Utah Nursery and Landscape Association
http://www.utahgreen.org/

UDAF Insect and Quarantine Program
http://ag.utah.gov/plants-pests/insects.html

Grazing Improvement Program
http://ag.utah.gov/conservation-and-environmental/grazing-improvement.html

Summary of Invasive and Native Pest Risks

Africanized Honey Bee	Potential to disrupt Utah's $1.5 million honey industry, health risks to humans and livestock
Orchard Pests	Fruit industry pest, potential to devastate Utah's $17 million fruit industry
Cereal Leaf Beetle	Potential to reduce Utah's $715 million small grain and field crop industry
Emerald Ash Borer	Threaten to kill all ornamental and native ash trees in Utah
European Corn Borer	Potential to devastate Utah's $69 million corn harvest
Gypsy Moth	Potential to destroy Utah's watersheds, coniferous forests, and residential landscapes
Japanese Beetle	Potential to damage Utah's $128 million nursery and floriculture industry, and $17 million fruit industry
Mormon Cricket and Grasshopper	Potential to significantly reduce Utah's $715 million small grain and field crop industry
Red Imported Fire Ant	Economic damage caused in the US exceeds $5 billion and a public health risk